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Hollow fiber cartridge

Description of Technology: The present invention relates to improvements in fluid purification equipment, particularly of the reverse osmosis or ultrafiltration type. In particular, it relates to a fluid separation cartridge, particularly to a fluid separation cartridge using hollow fiber membranes having a selective permeability to fluid, particularly water. More particularly, it relates to a compact, unitary cartridge of hollow fiber membranes which readily enables multiple cartridges to be installed in a single pressure vessel, and may easily be installed in a pressure vessel, including a pressure vessel previously using spiral wound membranes. The cartridge is adapted for simplified installation and replacement on an as-needed periodic basic and is particularly useful for the purification and/or desalination of seawater, brackish water and wastewater.

Patent Listing:

1. **US Patent No.** 5,470,469**,** November 28, 1995, "Hollow fiber cartridge."
http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5470469.PN.&OS=PN/5470469&RS=PN/5470469

Market Potential: Existing designs have many disadvantages. For example, in many applications (such as shipboard or portable use) the maximum possible area of membrane must be contained in the smallest possible volume and it is desirable to have greater flow per unit volume of the device. Pressure vessels which house only one bundle of hollow fiber membranes require excessive external piping which is costly to install and takes up space.

There is also a need for compact transportable equipment for mobile or military use. There is also a need that such equipment be at least partially assembled during transport and that it be easy to complete the assembly for rapid use in the field.

Furthermore, it is desirable to have a range of sizes and dimensions of hollow fiber bundles made available for different applications. Varying feedstocks to be treated contain different amounts of impurities and for economy, those with few impurities should be treated at high flux rates through the membrane. Long cartridges containing fine hollow fibers are not able to provide a high velocity of drawoff of permeate because of the hydraulic pressure drop of flow in the narrow lumens of the fibers and hence short cartridges are required. Conversely, some feeds require longer cartridges where the lower membrane flux rates present no problems of lumen pressure drop.

Benefits:

- Simple, economical device.
- Multiple cartridges can be installed in a pressure vessel.
- Cartridges are easy to install.

Applications:

- Useful for the purification and/or desalination of seawater, brackish water, and waste water.
- Compact transportable equipment for mobile or military use.

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